Slope Section C2 - Post Drain and Proposed Final Profile Stability

Calculates stability of veneer covered slope

Model C2.2a1 Post Drain
1 in 3 0.4 Saturated

Construction plant loading(after Koerner & Soong (1998) 6th Int Conf on Geosynthetics)

weight of equipment			Wb	200	kN	
length of track			w	3	m	
width of track			b	0.6	m	
influence factor			I	0		- 0 if no plant loading
track pressure			q	55.56	kN/m2	
equivalent equipment force on geomembrane			We	0.00	kN/m	- add to weight of upper wedge
acceleration ratio			(a/g)	0		- 0 if pushing up slope
dynamic force parallel to slope			Fe	0.00	kN/m	- apply as active thrust

Vertical component of inter-slice force neglected to simplify analysis

Data Input

Interface details:				*Lower material* / *Upper material*	*Formation* / *LLDPE*	*LLDPE* / *GDL (6S250D)*	*GDL (6S250D)* / *Soils*
height of slope base *(actual)*		H	m	24.00	*92.00*	*92.00*	*92.00*
lining thickness		T1	m	1.00	*1.00*	*1.00*	*1.00*
slope of liner *(actual)*		Cot(alpha)		3.00	*3.00*	*3.00*	*3.00*
dry density		Gamdry-1	kN/m3	18.00	18.00	18.00	18.00
saturated density		Gamsat-1	kN/m3	20.00	21.00	21.00	21.00
saturated thickness interface		Tw	m	0.00	0.00	*0.40*	*0.40*
saturated thickness cover soil				1.30	*0.00*	*0.00*	*0.00*
interface cohesion		C1	kN/m2	0.00	0.00	4.00	10.40
interface friction angle		Phi-1	deg	30.00	30.00	27.00	36.50
soil cohesion		C2	kN/m2	5.00	0.00	0.00	0.00
soil friction angle		Phi-2	deg	25.00	30.00	30.00	30.00
active thrust at top of slope		Pa	kN	0.00	0.00	0.00	0.00
reinforcement		Tr	kN	0.00	0.00	0.00	0.00

Calculations

nett active force			kN	0.00	0.00	0.00	0.00
slope of liner		alpha	rads	0.32	0.32	0.32	0.32
length of interface		L1	m	75.89	290.93	290.93	290.93
length of soil		L2	m	3.16	3.16	3.16	3.16
weight of upper wedge		W1	kN	1366.10	5236.73	5236.73	5236.73
weight of lower wedge		W2	kN	35.63	30.00	30.00	30.00
pwp on interface		U'	kN	0.00	0.00	1083.02	1083.02
pwp in cover soil		U''	kN	24.87	0.00	0.00	0.00
Disturbing force		D+Pa-Tr	kN	432.00	1656.00	1656.00	1656.00
Resisting Forces		T1	kN	748.25	2868.28	3143.21	5900.40
		Ts	kN	20.83	17.32	17.32	17.32
Factor of Safety		**Fs**		1.73	**1.74**	**1.91**	**3.57**
FoS greater than 1.3 reported in the SRA				*YES*	*YES*	*YES*	*YES*
Ignore lower wedge		Fs = T1/D		1.73	1.73	1.90	3.56
		Lower material / *Upper material*		*formation* / *geotextile*	*Formation* / *LLDPE*	*LLDPE* / *GDL (6S250D)*	*GDL (6S250D)* / *Soils*

Critical Interface

Slope Section C2 - Post Drain and Proposed Final Profile Stability

Calculates stability of veneer covered slope

Model C2.2b1 **Post Drain**
1 in 2.7 **0.4 Saturated**

Construction plant loading(after Koerner & Soong (1998) 6th Int Conf on Geosynthetics)

weight of equipment			Wb	200	kN	
length of track			w	3	m	
width of track			b	0.6	m	
influence factor			I	0		- 0 if no plant loading
track pressure			q	55.56	kN/m2	
equivalent equipment force on geomembrane			We	0.00	kN/m	- add to weight of upper wedge
acceleration ratio			(a/g)	0		- 0 if pushing up slope
dynamic force parallel to slope			Fe	0.00	kN/m	- apply as active thrust

Vertical component of inter-slice force neglected to simplify analysis

Data Input

Interface details:		*Lower material* / *Upper material*		*Formation* / *geotextile*	**Formation** / **LLDPE**	*LLDPE* / **GDL (6S250D)**	*GDL (6S250D)* / *Soils*
height of slope base *(actual)*		H	m	24.00	*92.00*	*92.00*	*92.00*
lining thickness		T1	m	1.00	*1.00*	*1.00*	*1.00*
slope of liner *(actual)*		Cot(alpha)		3.00	*2.70*	*2.70*	*2.70*
dry density		Gamdry-1	kN/m3	18.00	18.00	18.00	18.00
saturated density		Gamsat-1	kN/m3	20.00	21.00	21.00	21.00
saturated thickness interface		Tw	m	0.00	0.00	*0.40*	*0.40*
saturated thickness cover soil				1.30	*0.00*	*0.00*	*0.00*
interface cohesion		C1	kN/m2	0.00	0.00	4.00	10.40
interface friction angle		Phi-1	deg	30.00	30.00	27.00	36.50
soil cohesion		C2	kN/m2	5.00	0.00	0.00	0.00
soil friction angle		Phi-2	deg	25.00	30.00	30.00	30.00
active thrust at top of slope		Pa	kN	0.00	0.00	0.00	0.00
reinforcement		Tr	kN	0.00	0.00	0.00	0.00

Calculations

nett active force			kN	0.00	0.00	0.00	0.00
slope of liner		alpha	rads	0.32	0.35	0.35	0.35
length of interface		L1	m	75.89	264.89	264.89	264.89
length of soil		L2	m	3.16	2.88	2.88	2.88
weight of upper wedge		W1	kN	1366.10	4768.01	4768.01	4768.01
weight of lower wedge		W2	kN	35.63	27.63	27.63	27.63
pwp on interface		U'	kN	0.00	0.00	974.72	974.72
pwp in cover soil		U''	kN	24.87	0.00	0.00	0.00
Disturbing force		D+Pa-Tr	kN	432.00	1656.00	1656.00	1656.00
Resisting Forces		T1	kN	748.25	2581.45	2841.10	5342.11
		Ts	kN	20.83	15.95	15.95	15.95
Factor of Safety		**Fs**		1.79	**1.57**	**1.73**	**3.24**
FoS greater than 1.3 reported in the SRA				*YES*	*YES*	*YES*	*YES*
Ignore lower wedge		Fs = T1/D		1.73	1.56	1.72	3.23
		Lower material / *Upper material*		*Formation* / *geotextile*	**Formation** / **LLDPE**	*LLDPE* / **GDL (6S250D)**	*GDL (6S250D)* / *Soils*

Critical Interface

Slope Section C2 - Post Drain and Proposed Final Profile Stability

Calculates stability of veneer covered slope

Model C2.2a2 **Post Drain**
1 in 3 **0.2 Saturated**

Construction plant loading(after Koerner & Soong (1998) 6th Int Conf on Geosynthetics)

weight of equipment			Wb	200	kN	
length of track			w	3	m	
width of track			b	0.6	m	
influence factor			I	0		- 0 if no plant loading
track pressure			q	55.56	kN/m2	
equivalent equipment force on geomembrane			We	0.00	kN/m	- add to weight of upper wedge
acceleration ratio			(a/g)	0		- 0 if pushing up slope
dynamic force parallel to slope			Fe	0.00	kN/m	- apply as active thrust

Vertical component of inter-slice force neglected to simplify analysis

Data Input

Interface details:		*Lower material*		*formation*	**Formation**	*LLDPE*	***GDL (6S250D)***
		Upper material		*geotextile*	**LLDPE**	***GDL (6S250D)***	***Soils***
height of slope base *(actual)*		H	m	24.00	*92.00*	*92.00*	*92.00*
lining thickness		T1	m	1.00	*1.00*	*1.00*	*1.00*
slope of liner *(actual)*		Cot(alpha)		3.00	*3.00*	*3.00*	*3.00*
dry density		Gamdry-1	kN/m3	18.00	18.00	18.00	18.00
saturated density		Gamsat-1	kN/m3	20.00	21.00	21.00	21.00
saturated thickness interface		Tw	m	0.00	0.00	*0.20*	*0.20*
saturated thickness cover soil				1.30	*0.00*	*0.00*	*0.00*
interface cohesion		C1	kN/m2	0.00	0.00	4.00	10.40
interface friction angle		Phi-1	deg	30.00	30.00	27.00	36.50
soil cohesion		C2	kN/m2	5.00	0.00	0.00	0.00
soil friction angle		Phi-2	deg	25.00	30.00	30.00	30.00
active thrust at top of slope		Pa	kN	0.00	0.00	0.00	0.00
reinforcement		Tr	kN	0.00	0.00	0.00	0.00

Calculations

nett active force			kN	0.00	0.00	0.00	0.00
slope of liner		alpha	rads	0.32	0.32	0.32	0.32
length of interface		L1	m	75.89	290.93	290.93	290.93
length of soil		L2	m	3.16	3.16	3.16	3.16
weight of upper wedge		W1	kN	1366.10	5236.73	5236.73	5236.73
weight of lower wedge		W2	kN	35.63	30.00	30.00	30.00
pwp on interface		U'	kN	0.00	0.00	541.51	541.51
pwp in cover soil		U''	kN	24.87	0.00	0.00	0.00
Disturbing force		D+Pa-Tr	kN	432.00	1656.00	1656.00	1656.00
Resisting Forces		T1	kN	748.25	2868.28	3419.13	6301.10
		Ts	kN	20.83	17.32	17.32	17.32
Factor of Safety		**Fs**		1.78	**1.74**	**2.08**	**3.82**
FoS greater than 1.3 reported in the SRA				*YES*	*YES*	*YES*	*YES*
Ignore lower wedge		Fs = T1/D		1.73	1.73	2.06	3.81
		Lower material		*formation*	**Formation**	***LLDPE***	***GDL (6S250D)***
		Upper material		*geotextile*	**LLDPE**	***GDL (6S250D)***	***Soils***

Critical Interface

Slope Section C2 - Post Drain and Proposed Final Profile Stability

Calculates stability of veneer covered slope

Model C2.2b2 Post Drain
1 in 2.7 0.2 Saturated

Construction plant loading(after Koerner & Soong (1998) 6th Int Conf on Geosynthetics)

weight of equipment			Wb	200	kN	
length of track			w	3	m	
width of track			b	0.6	m	
influence factor			I	0		- 0 if no plant loading
track pressure			q	55.56	kN/m2	
equivalent equipment force on geomembrane			We	0.00	kN/m	- add to weight of upper wedge
acceleration ratio			(a/g)	0		- 0 if pushing up slope
dynamic force parallel to slope			Fe	0.00	kN/m	- apply as active thrust

Vertical component of inter-slice force neglected to simplify analysis

Data Input

Interface details:		*Lower material*		*formation*	***Formation***	***LLDPE***	***GDL (6S250D)***
		Upper material		*geotextile*	***LLDPE***	***GDL (6S250D)***	***Soils***
height of slope base *(actual)*		H	m	24.00	*92.00*	*92.00*	*92.00*
lining thickness		T1	m	1.00	*1.00*	*1.00*	*1.00*
slope of liner *(actual)*		Cot(alpha)		3.00	*2.70*	*2.70*	*2.70*
dry density		Gamdry-1	kN/m3	18.00	18.00	18.00	18.00
saturated density		Gamsat-1	kN/m3	20.00	21.00	21.00	21.00
saturated thickness interface		Tw	m	0.00	0.00	*0.20*	*0.20*
saturated thickness cover soil				1.30	*0.00*	*0.00*	*0.00*
interface cohesion		C1	kN/m2	0.00	0.00	4.00	10.40
interface friction angle		Phi-1	deg	30.00	30.00	27.00	36.50
soil cohesion		C2	kN/m2	5.00	0.00	0.00	0.00
soil friction angle		Phi-2	deg	25.00	30.00	30.00	30.00
active thrust at top of slope		Pa	kN	0.00	0.00	0.00	0.00
reinforcement		Tr	kN	0.00	0.00	0.00	0.00

Calculations

nett active force			kN	0.00	0.00	0.00	0.00
slope of liner		alpha	rads	0.32	0.35	0.35	0.35
length of interface		L1	m	75.89	264.89	264.89	264.89
length of soil		L2	m	3.16	2.88	2.88	2.88
weight of upper wedge		W1	kN	1366.10	4768.01	4768.01	4768.01
weight of lower wedge		W2	kN	35.63	27.63	27.63	27.63
pwp on interface		U'	kN	0.00	0.00	487.36	487.36
pwp in cover soil		U''	kN	24.87	0.00	0.00	0.00
Disturbing force		D+Pa-Tr	kN	432.00	1656.00	1656.00	1656.00
Resisting Forces		T1	kN	748.25	2581.45	3089.43	5702.74
		Ts	kN	20.83	15.95	15.95	15.95
Factor of Safety		**Fs**		1.78	**1.57**	**1.88**	**3.45**
FoS greater than 1.3 reported in the SRA				*YES*	*YES*	*YES*	*YES*
Ignore lower wedge		Fs = T1/D		1.73	1.56	1.87	3.44
		Lower material		*formation*	***Formation***	***LLDPE***	***GDL (6S250D)***
		Upper material		*geotextile*	***LLDPE***	***GDL (6S250D)***	***Soils***

Critical Interface